



PORTABLE THREE-DIMENSIONAL WATERFALL GRAPHIC PRINT

IITM Technology Available for Licensing

Problem Statement

- LED displays are prone to color shifts, environmental pollution, frequent replacements, and high costs due to temperature effects and damage from high electrical currents.
- Moreover, Current three-dimensional waterfall graphic systems use solenoid valves and microcontrollers but are not portable and often limited in controlling a large number of valves.
- There is a need for a portable, bi-color waterfall graphic print device that uses water as a display medium, controlled through advanced microcontrollers and solid-state devices.

Intellectual Property

- IITM IDF Ref 1639
- IN 544009 Patent Granted

TRL (Technology Readiness Level)

TRL 9 Actual System Proven in operational environment

Technology Category/ Market

Category- Electronics & Circuits / Green Technology

Industry Classification:

Display Technology ; Entertainment & Event Production ; Advertising & Digital Signage; Automation & Control Systems

Applications:

Signs, lighting, data communication and other signaling, display media, advertisement, patterns & images; advertisements in shopping malls, museums and entertainment shows ; Fountains

Market report:

The global 3D Display market is projected to grow from USD 78.05 Billion in 2024 to USD 260.7 Billion by 2032, with a CAGR of 16.27%

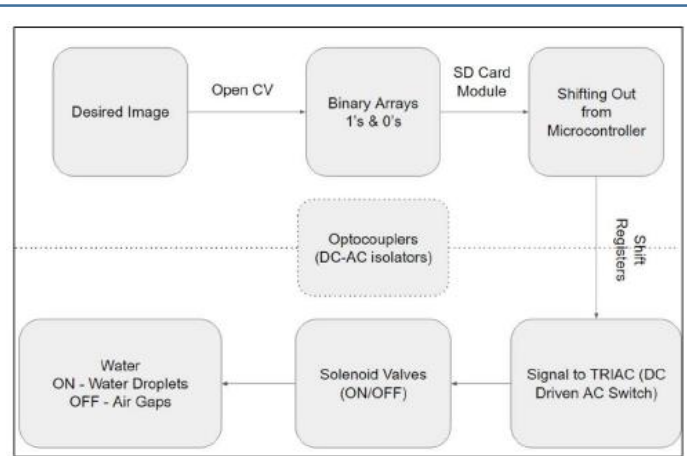


Figure: The overall working flow of the graphic print device as a block diagram



Figure: Diagram of the mechanical structure that helps suspend the tank

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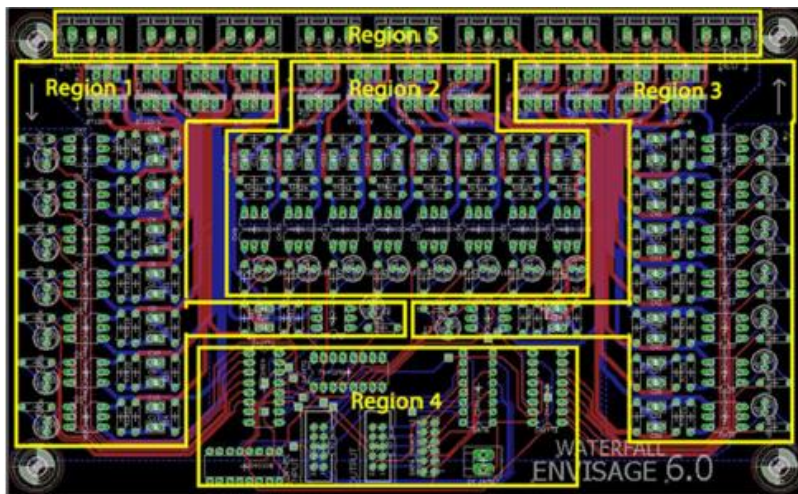


Figure: Schematic of the Printed Circuit Boards designed and used in the device

Technology

The system features a cylindrical screen using falling water controlled by solenoid valves, driven by a pre-programmed Arduino microcontroller and custom PCBs for image display.

Images are converted to binary data and stored on an SD card. A custom algorithm and OpenCV are used to convert images, enabling continuous pattern generation.

A series of solenoid valves control water flow in the display. The solenoids are activated by the Arduino via shift registers, opto-couplers, and TRIAC for precise ON/OFF control

The system uses a simple Arduino UNO, TRIAC, and shift registers to control 136 solenoid valves. (16 per board) This setup reduces complexity and improves reliability compared to traditional LED displays.

Key Features / Value Proposition

- Uses falling water controlled by solenoid valves for displaying 3D graphics, offering a unique and dynamic visual compared to conventional static LED displays.
- Unlike LED displays, the water-based system requires less maintenance, utilizes water (a renewable resource), and uses far fewer electronic components, making it more eco-friendly.
- The system operates with fewer electrical components compared to LEDs, consuming less power and being more energy-efficient, making it more sustainable in the long run.
- Unlike LED systems with numerous electronic components, this device uses a minimal number of components (Arduino, shift registers, TRIAC), reducing complexity and maintenance needs.
- The modular and compact design, with water circulation and a cylindrical screen, makes the technology easily portable and scalable for use in various applications like museums and exhibitions.

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